

CLAIMS

1. A navigation system comprising at least one navigation apparatus and at least one server apparatus, wherein

5 the navigation apparatus comprises

a communication controller for controlling communication with the server apparatus,

a current location detector for detecting a current location,

a map information memory for storing map information,

10 a display for displaying map information and the current location, and

a controller for calculating a planned travel route and for controlling the communication controller, the current location detector, the map information memory, and the display,

15 the server apparatus reads out map information from a database and transmits the map information to the navigation apparatus,

the communication controller of the navigation apparatus transmits to the server apparatus the current location, a destination location, and an area of the map information stored in the memory,

20 the server apparatus receives these, calculates one or more preliminary travel routes from the current location to the destination location, sets, respectively for the preliminary travel routes, preliminary passage locations within the area of the map information stored in the navigation apparatus, and transmits the preliminary passage locations to the navigation apparatus,

the communication controller of the navigation apparatus receives these, and the

controller calculates, respectively for the preliminary passage locations, planned travel routes thereto from the current location, and

one of the preliminary passage locations is selected.

5 2. A navigation apparatus comprising:

a communication controller for controlling communication with a server apparatus,

a current location detector for detecting a current location,

a map information memory for storing map information,

10 a display for displaying map information and the current location, and

a controller for calculating a planned travel route and for controlling the communication controller, the current location detector, the map information memory, and the display, wherein

15 when the current location comes within a predetermined distance of a previously set passage location,

the communication controller

receives, from the server apparatus, map information of a predetermined area that is not stored in the map information memory, and stores the received map information in the map information memory,

20 transmits, to the server apparatus, the passage location of which the current location has come within the predetermined distance and an area of the map information stored in the map information memory, and

receives, from the server apparatus and based on one or more preliminary travel routes from the passage location of which the current location has come within the

predetermined distance to a destination location as calculated by the server apparatus, next preliminary passage locations set, respectively for the preliminary travel routes, within the area of the map information stored in the map information memory,

the controller calculates, respectively for the next preliminary passage locations,
5 planned travel routes thereto from the passage location of which the current location has come within the predetermined distance, and
one of the next preliminary passage locations is selected.

3. A navigation apparatus comprising:

10 a communication controller for controlling communication with a server apparatus,

a current location detector for detecting a current location,

a map information memory for storing map information,

a display for displaying map information and the current location, and

15 a controller for calculating a planned travel route and for controlling the communication controller, the current location detector, the map information memory, and the display, wherein

the communication controller

transmits, to the server apparatus, the current location, a destination location,

20 and an area of the map information stored in the map information memory, and

receives, from the server apparatus and based on one or more preliminary travel routes from the current location to the destination location as calculated by the server apparatus, preliminary passage locations set, respectively for the preliminary travel routes, within the area of the map information stored in the map information memory,

the controller calculates, respectively for the preliminary passage locations, planned travel routes thereto from the current location,

one of the preliminary passage locations is selected,

when the current location comes within a predetermined distance of the selected
5 passage location,

the communication controller

receives, from the server apparatus, map information of a predetermined area that is not stored in the map information memory, and stores the received map information in the map information memory,

10 transmits, to the server apparatus, the passage location of which the current location has come within the predetermined distance and an area of the map information stored in the map information memory, and

receives, from the server apparatus and based on one or more next preliminary travel routes from the passage location of which the current location has come within the
15 predetermined distance to the destination location as calculated by the server apparatus, next preliminary passage locations set, respectively for the next preliminary travel routes, within the area of the map information stored in the map information memory,

the controller calculates, respectively for the next preliminary passage locations, planned travel routes thereto from the passage location of which the current location has come
20 within the predetermined distance, and

one of the next preliminary passage locations is selected.

4. A navigation apparatus as claimed in claim 2 or 3,

wherein, when a deviation from a planned travel route is recognized while guidance

along a travel route is being given, a planned travel route is calculated based on the preliminary passage locations.

5. A navigation apparatus as claimed in claim 3,

5 wherein the preliminary passage locations are given different ranks of priority by the server apparatus.

6. A navigation apparatus as claimed in claim 3,

10 wherein the navigation apparatus has a capability of previously selecting among different combinations of scale factors of map information received from the server apparatus.

7. A navigation apparatus as claimed in claim 6,

15 wherein the navigation apparatus displays, along with a list of the combinations of scale factors, expected communication fees respectively for the combinations.

8. A navigation apparatus as claimed in claim 6,

wherein the navigation apparatus displays, along with a list of the combinations of scale factors, expected received data amounts respectively for the combinations.

20 9. A navigation apparatus as claimed in claim 6,

wherein the navigation apparatus displays, along with a list of the combinations of scale factors, expected reception durations respectively for the combinations.

10. A server apparatus that reads out map information from a database and

transmits the map information to a navigation apparatus, wherein,

when the server apparatus receives, from the navigation apparatus, a current location, a destination location, and an area of map information stored in the navigation apparatus, the server apparatus

5 calculates one or more preliminary travel routes from the current location to the destination location,

sets, respectively for the preliminary travel routes, preliminary passage locations within the area of the map information stored in the navigation apparatus, and

transmits the preliminary passage locations to the navigation apparatus, and

10 when the server apparatus receives, from the navigation apparatus, one of the preliminary passage locations and an area of map information stored in the navigation apparatus, the server apparatus

calculates one or more preliminary travel routes from the received passage location to the destination location,

15 sets, respectively for the preliminary travel routes, next preliminary passage locations within the area of the map information stored in the navigation apparatus, and

transmits the next preliminary passage locations to the navigation apparatus.

11. A server apparatus as claimed in claim 10,

20 wherein the server apparatus gives the preliminary passage locations different ranks of priority.

12. A navigation apparatus that guides along a travel route from a start location to a destination location by using map information received from a server apparatus,

wherein the navigation apparatus has a capability of previously selecting among different combinations of data amounts or scale factors of the received map information.

13. A navigation apparatus as claimed in claim 12,

5 wherein the navigation apparatus displays, along with a list of the combinations of data amounts or scale factors, expected communication fees respectively for the combinations.

14. A navigation apparatus as claimed in claim 12,

10 wherein the navigation apparatus displays, along with a list of the combinations of data amounts or scale factors, expected received data amounts respectively for the combinations.

15. A navigation apparatus as claimed in claim 12,

15 wherein the navigation apparatus displays, along with a list of the combinations of data amounts or scale factors, expected reception durations respectively for the combinations.